VERIFICATION CERTIFICATE

EUFI29-22001100-VA:EN

Eurofins Expert Services Oy has, based on the act given about the approval of certain construction products (954/2012, updated with act 1262/2014) taking into account the provisions of the chapter 3 and provisions of decree given by the Ministry of the Environment on the approval of certain construction products (555/2013, updated with act 66/2015), issued the following verification certificate.

HTM Yhtiöt Oy, Tiilitehtaantie 23, 12310 Ryttylä

HT-pile

Certificated performance levels are presented in Annex 2.

Product description is presented in Annex 3 and premises to use in Annex 4.

Compliance with the requirements has been assessed according to the assessment criteria issued by the Ministry of Environment “Pile Rock shoes and pile joints”. Assessment and verification of constancy of performance system applied is 2+.

The verification mark presented in this certificate shall be attached to the product, its packing or to the documents. The verified product properties shall be presented with the mark in accordance with Annex 5.

This verification certificate has been issued on 20.3.2022and it is valid at the most until 20.3.2027. Conditions of the validity can be checked from Annex 1.

The validity of the certificate can be checked from the websites www.sertifikaattihaku.fi

Espoo 4.3.2022

Katja Vahtikari
Manager, Certification & Inspection

Tatu Toivonen
Assessor

This document is signed electronically

Annexes
1. Conditions of validity
2. Verified performance levels of the product
3. Product description delivered by the manufacturer
4. Prerequisites to use the product
5. Marking of the verified product

EUROFINS EXPERT SERVICES OY
Kivimiehentie 4
FI-02150 Espoo
sertifikaattihaku.fi
VAT: 2297513-2

Annex 1: Conditions of validity

A verification certificate is granted for a specific period of time, for a maximum of five years at a time. An approved body may, if necessary, require a temporary evaluation as assurance that the properties of the product comply with what is stated in the declaration made by the manufacturer. Products that have been inspected batch-specifically may only be taken into use after an approved body has issued a verification certificate approving the batch for use. (954/2012 §14)

The verification certificate will be cancelled if the construction product does not fulfil the requirements presented in the land use and building act or the technical requirements based on the act. If the product enters the CE marking the verification certificate expires. (954/2012 §14).

A further prerequisite for the use of a verification certificate is that the manufacturer carries out internal production quality control and testing. The certifying body for quality control certifies internal production quality control by carrying out an initial inspection of quality control, by monitoring quality control continuously, and by evaluating and approving quality control. (954/2012 §12)

An Approved and quality control body shall notify the manufacturer in writing the defects found in the product quality or safety and demand the manufacturer establish the product in accordance with the verification certificate in given time. (555/1213 §8)

An approved body issuing the verification certificates shall cancel the verification certificate in case the importer or the manufacturer or its representative does not correct the flaws detected by the quality control. (954/2012 §12)

The verification certificate shall be cancelled immediately in case the usage of the construction product is prohibited by Finnish Safety and Chemicals Agency (Tukes) or the importer or the manufacturer or its representative is ordered to withdraw the product from the markets by Tukes. (954/2012 §12)

Verification certificate is public document. A list is kept by Eurofins Expert Services Oy on the websites www.sertifikaattihaku.fi.

Before granting the verification certificate, the manufacturer shall inform the name of authorized body of the quality control body.

The manufacturer is in charge of the product's quality and factory production control. In awarding this certificate, Eurofins Expert Services Oy does not bind itself to indemnification liability concerning personal injury or other damage that may directly or indirectly result from using the product described in this certificate.

The use of the name of Eurofins Expert Services Oy or the name Eurofins in any other form in advertising or distribution in part of this certificate is only permissible with a written authorization from Eurofins Expert Services Oy.

Annex 2: Verified performance levels of the product

The verified performance levels are according to the below table. The presented requirements are minimum requirement, material with a higher performance levels is allowed to use.

Table 2-1. Properties of pile joints and assessment the properties.

Property	Assessment criteria	Performance level
Bending resistance and bending stiffness	EN 1993-5 NA*	$M = W_{el} * f_y$ $EI = 0,75 * EI_{pile\ pipe}$ (in moment range 0,3 – 0,8 * M)
Tension resistance	EN 1993-5 NA	$N_t = 0,15 * A_s * f_y$
Compression resistance	EN 1993-5 NA	$N_c = A_s * f_y$
Robustness of pile joints:	RIL 254-2016	Impact blow test PTL2, with stress level 0,60* f_y Impact blow test PTL3, with stress level 0,75* f_y Table 2-2.
Material properties and tolerances	EN 10210, EN 10219 or material certificate	Material certificate in accordance with EN 10204 3.1.
Manufacturing of the product	Manufacturing according to EN 1090-2	EXC2

*Bendind resistance of a pile without mechanical pile joint can be either calculated or tested according to EN 12794+A1:2007 Annex A or RIL 254-2016 point 3.9.3.1. Compression resistance of the pile joint can be estimated by calculations.

Table 2-2. Ultimate strength values for mechanically jointed, impact driven HT piles. The piling classes PTL3 and PTL2 are presented in guide RIL 254-2016

Pile	Diameter [mm]	Wall thickness [mm]	Steel grade	$R_{k;geo;max}$ PTL3 [kN]	$R_{k;geo;max}$ PTL2 [kN]
HT90	88,9	6,3	S460MH	-	541
HT115/6,3	114,3	6,3	S460MH	885	708
HT115/6,3	114,3	6,3	S550J2H	-	846
HT115/8	114,3	8,0	S460MH	1106	885
HT115/8	114,3	8,0	S550J2H	-	1058
HT127/6,3	127,0	6,3	S460MH	989	791
HT127/6,3	127,0	6,3	S550J2H	-	946
HT140/8	139,7	8,0	S460MH	1370	1096
HT140/8	139,7	8,0	S550J2H	1638	1311
HT140/10	139,7	10,0	S460MH	1687	1350
HT140/10	139,7	10,0	S550J2H	2017	1614
HT170/10	168,3	10,0	S460MH	2059	1647
HT170/10	168,3	10,0	S550J2H	2462	1969
HT170/12,5	168,3	12,5	S460MH	2533	2026
HT170/12,5	168,3	12,5	S550J2H	3029	2423
HT220/10	219,1	10,0	S460MH	2720	2176
HT220/10	219,1	10,0	S550J2H	3252	2601
HT220/12,5	219,1	12,5	S460MH	3359	2687
HT220/12,5	219,1	12,5	S550J2H	4016	3213

Table 2-3. Properties of friction jointed rock shoes and evaluation of the properties

Property	Assessment criteria	Performance level
Compression resistance N_{yk}	RIL 254-2016 **Technical requirements for rock shoes of steel piles, instructions of the Finnish transport Agency 1249/067/2012 22.3.2012 and**additional instructions for designing rock shoes of steel piles, calculating with FEM, Finnish transport Agency 8.5.2013	$N_{yk} = A_s * f_{yk}$ A_s area of steel in a pile f_{yk} Yield strength of the steel
Bending and shear resistance of friction jointed rock shoes and Robustness	RIL 254-2016	Bending and resistance ≥ max($R_{c;max} * d_{point} / 10$, $R_{c;max} * d_{pile} / 20$) shear resistance ≥ 0,04 * $R_{c;max}$ Impact blow test PTL2, with stress level 0,60* f_y Impact blow test PTL3, with stress level 0,75* f_y
Tension resistance	RIL 254-2016*	Tension resistance ≥ 0,15·$R_{c;max}$
Material properties and tolerances	Material standard in question	Material certificate in accordance with EN 10204 3.1
Geometrical properties	RIL 254-2016	RIL 254-2016 picture 3.3 point angle of the rock shoe ≥60°
Manufacturing	Manufacturing according to EN1090-2	EXC2

* Is used when a rock shoe is fastened with friction to the pile
**Shall be followed when performance level is evaluated by calculations.

Table 2-4. Ultimate strength values for friction jointed rock shoe

Pile	**Diameter [mm]**	**Wall thickness** [mm]	**Steel grade of a pile**	$R_{k;geo;max}$ **PTL3** [kN]	$R_{k;geo;max}$ **PTL2** [kN]
HT90	88.9	6.3	S460MH	-	541
HT115/6,3	114.3	6.3	S460MH	885	708
			S550J2H	-	846
HT115/8	114.3	8	S460MH	1106	885
			S550J2H	-	1058
HT127/6,3	127	6.3	S460MH	989	791
			S550J2H	-	946
HT140/8	139.7	8	S460MH	1370	1096
			S550J2H	1638	1311
HT140/10	139.7	10	S460MH	1687	1350
			S550J2H	2017	1614
HT170/10	168.3	10	S460MH	2059	1647
			S550J2H	2462	1969
HT170/12,5	168.3	12.5	S460MH	2533	2026
			S550J2H	3029	2423
HT220/10	219.1	10	S460MH	2720	2176
			S550J2H	3252	2601
HT220/12,5	219.1	12.5	S460MH	3359	2687
			S550J2H	4016	3213
HT270/10	273	10	S460MH	3421	2737
HT270/12,5	273	12.5	S460MH	4235	3388
HT320/10	323.9	10	S460MH	-	3266
HT320/12,5	323.9	12.5	S460MH	-	4050

Annex 3: Product description delivered by the manufacturer

HT piles are foundation piles installed by driving, drilling or vibrating. HT piles can be used as a single piles, group of piles or components of different foundation structures.

HT-steel pile system consists of following components and services:

- pile pipes outer diameter 88,9 – 323,9 mm
- Driven piles with mechanical joints HT90-HT220
- Rock shoes, bottom plates and bearing plates HT90-HT320
- bevelling, cutting and joint welding of pile pipes
- equipping of pile pipes according to the plans of the customer

Table 3-1. Dimensions of piles, steel grades, pile components and accessories of HT-piles

Pile	Diameter [mm]	Wall thickness [mm]	Steel grade	Mechanical jointi	Bottom plate	Rock shoe	Bearing plate
HT90	88,9	6,3	S460MH	x	x	x	x
HT115/6,3	114,3	6,3	S460MH/S550J2H	x	x	x	x
HT115/8	114,3	8,0	S460MH/S550J2H	x	x	x	x
HT127/6,3	127,0	6,3	S460MH/S550J2H	x	x	x	x
HT140/8	139,7	8,0	S460MH/S550J2H	x	x	x	x
HT140/10	139,7	10,0	S460MH/S550J2H	x	x	x	x
HT170/10	168,3	10,0	S460MH/S550J2H	x	x	x	x
HT170/12,5	168,3	12,5	S460MH/S550J2H	x	x	x	x
HT220/10	219,1	10,0	S460MH/S550J2H	x	x	x	x
HT220/12,5	219,1	12,5	S460MH/S550J2H	x	x	x	x
HT270/10	273,0	10,0	S460MH		x	x	x
HT270/12.5	273,0	12,5	S460MH		x	x	x
HT320/10	323,9	10,0	S460MH		x	x	x
HT320/12.5	323,9	12,5	S460MH		x	x	x

Picture 3-1. HT-pile pipe HT90 - HT220

Picture 3-2. Bearing plate, HT90 - HT320

Picture 3-3. HT-rock shoe, HT90 - HT320

Picture 3-4. HT-bottom plate, HT90 - HT320

Table 3-2. Material used with the products.

No	Use area	Type	Standard
1.	Structural steel pipes used with pile pipes and -elements	S355J2H, S460MH S550J2H	EN10219, table 3-3 EN10219 and table 3-3 EN10204 3.1 material certificate
2.	Materials used with bearing plates and rock shoes	S355J2 S235-355J2H, S460MH 27MnCrB5-2, 34CrNiMo6	EN10025 EN10219 EN10083

Table 3-3. Properties of steel grades S460MH and S550J2H

Steel grade	CEV maks.	Chemical properties [%, max.]					Mechanical properties			Minimum impact energy KVb	
		C	Si	Mn	P	S	f_y min [MPa]	f_u [MPa]	A min [%]	T [°C]	KV min [J]
S460MH	0,46	0,16	0,60	1,70	0,035	0,030	460	530-720	17	-20	40
S550J2H	0,47	0,16	0,50	2,20	0,030	0,030	550	605-760	14	-20	27

Annex 4: Prerequisites to use the product

Design

Geotechnical and structural load bearing capacity of the steel pipe pile shall be dimensioned according to valid EN standards and/or national regulations taking account the properties mentioned in annex 2.

The structures attached to the piles shall be designed according to valid EN-standards in question and/or national regulations.

The manufacturer has drawn following installation and design instructions.

- Design and installation instructions of the HT-steel piles, version 3/2017
- Driving instructions for HT-steel piles version 12/2015
- Handling instructions for HT-steel piles version, version 12/2015
- Welding instructions HT-steel piles version, version 12/2015

Ultimate strength values for mechanically jointed, impact driven HT piles are presented in Annex 2, table 2-2. Ultimate strength values of unjointed or welded pile joints is calculated according to RIL254-2016 part 1 point 4.7.2.

Manufacturing

The manufacturer produces the products according to the EN1090-2, instructions and requirements of the internal quality control and according to the drawings drawn by the manufacturer. Besides the manufacturer's archives, valid manufacturing drawings are also kept in the archives of Eurofins Expert Services Oy. Products are manufactured in class EXC2 in accordance with EN 1090-2.

Delivery and storage on the site

The products are delivered as a single pile pipes or a pile bundle. Pile can consist of pile pipe or pile element including a joint. Bottom plates are delivered either attached to the piles or packed in a pallet. Bearing plates are delivered separated packed in a pallet. The delivery takes place according to the agreement between the customer and supplier.

The storage, handling and installation of the products shall be done according to the instructions of the manufacturer. The manufacturer is not responsible of the installation of the products.

Use and installation

HT-piles can be used in all kinds of foundation structures like example in foundations of buildings, bridges or roads.

Installation of the piles shall be done according to applicable EN-standards, national guidance and requirements and installation instructions of the manufacturer.

References

RIL 254-2016. Paalutusohje 2016 (piling instructions), PO-2016. Suomen Rakennusinsinöörien Liitto RIL ry. Grano Oy 2016. 296 s.

SFS-EN 1993-5 Eurokoodi 3: Teräsrakenteiden suunnittelu. Osa 5: Paalut. (Eurocode 3. Design of steel structures. Part 5: Piling) Kansallinen liite. Suomen rakentamismääräyskokoelma, Rakenteiden lujuus ja vakaus, Teräsrakenteet. 20.12.2016

SFS-EN 10219-1/2 Kylmämuovatut hitsatut seostamattomista teräksistä ja hienoraeteräksistä valmistetut rakenneputket. Osat 1 ja 2. (Cold formed welded structural hollow sections of non-alloy and fine grain steels. Part 1 and 2) 11.9.2006.

SFS-EN 10204 Metallituotteiden ainestodistukset. (Metallic products. Types of inspection documents) 21.12.2004

SFS-EN 1090-2 + A1 Teräs- ja alumiinirakenteiden toteutus. Osa 2: Teräsrakenteita koskevat tekniset vaatimukset. (Execution of steel structures and aluminium structures. Part 2: Technical requirements for steel structures) 5.3.2012

Annex 5: Marking of the verified product

The authorized body shall use a verification certificate logo, which separates the verification certificate from other voluntary certificates issued by the authorized body. The manufacturer shall attach the logo into product, its packing or the documents (555/2013 § 7).

The prodcuts verified according to the assessment criteria **"Pile Rock shoes and pile joints"** can be marked with verification certificate logo and by means provided by the certificate issuer. The product shall be marked and performance levels shall be declared in following manner:

- Manufacturer information
- Verification certificates issued by the Eurofins Expert Services Oy shall have the logo with the name of the Eurofins Expert Services Oy and number of the verification certificate
- Tracebility information of the product like production time, production description and product number

Marking of the product is presented below. The picture is example. The number attached to the logo is presented in the header of this certificate. The verification certificate mark can be delivered to the customer as a separate file.

CONSTRUCTION eurofins VERIFICATION CERTIFICATE	HTM Yhtiöt Oy Tiilitehtaantie 23 12310 Ryttylä Suomi
Product number	
Product description	
Manufacturing date	